

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

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PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

(PCT Rule 71.1)

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IMPORTANT NOTIFICATION

International application No.  
PCT/IT2004/000398

International filing date (day/month/year)  
22.07.2004

Priority date (day/month/year)  
24.07.2003

Applicant  
STOCCHIERO, Franco

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international  
preliminary examining authority:



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# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

|  |   |  |
|--|---|--|
| Applicant's or agent's file reference<br><b>PCT00031</b>   | <b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEAA16) |  |
| International application No.<br><b>PCT/IT2004/000398</b>  | International filing date ( <i>day/month/year</i> )<br><b>22.07.2004</b>  | Priority date ( <i>day/month/year</i> )<br><b>24.07.2003</b> |
| International Patent Classification (IPC) or both national classification and IPC<br><b>INV. H01M2/36 H01M2/04</b> |   |  |
| Applicant<br><b>STOCCHIERO, Franco</b>   |   |  |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets. **(5)**

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(II) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

|   |   |
|---|---|
| Date of submission of the demand<br><br><b>09.08.2005</b>   | Date of completion of this report<br><br><b>19.06.2006</b>  |
| Name and mailing address of the international preliminary examining authority:<br><br> <b>European Patent Office - P.B. 5818 Patentlaan 2<br/>NL-2280 HV Rijswijk - Pays Bas<br/>Tel. +31 70 340 - 2040 Tx: 31 651 epo nl<br/>Fax: +31 70 340 - 3016</b> | Authorized Officer<br><br><b>Métails, S</b><br><br>Telephone No. +31 70 340-3130<br><br> |

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**International application No. **PCT/IT2004/000398****I. Basis of the report**

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-3, 5-11

as originally filed

4

received on 09.08.2005 with letter of 09.08.2005

**Claims, Numbers**

1-17

received on 09.08.2005 with letter of 09.08.2005

**Drawings, Sheets**

1-10

as originally filed

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

|                               |             |                  |
|-------------------------------|-------------|------------------|
| Novelty (N)                   | Yes: Claims | 6 8 15           |
|                               | No: Claims  | 1-5 7 9-14 16-17 |
| Inventive step (IS)           | Yes: Claims | 8                |
|                               | No: Claims  | 1-7 9-17         |
| Industrial applicability (IA) | Yes: Claims | 1-17             |
|                               | No: Claims  |                  |

**2. Citations and explanations**

**see separate sheet**

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**Re Item V****Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

Reference is made to the following document:

D1: GB-A-1 285 166 (BOSCH GMBH ROBERT [DE]) 9 August 1972 (1972-08-09)

D2: GB-A-2 004 408 (VARTA BATTERIE AG) 28 March 1979 (1979-03-28)

D3: EP-A-0 692 828 (GLOBE-UNION INC) 17 January 1996 (1996-01-17)

**1. Clarity :**

The application does not meet the requirements of Article 6 PCT, because claim 1 is not clear. Present claim relates to a product (control means) which has a **given desired property or effect**, namely to prevent/allow the flow of said topping up liquid through a supply duct when the corresponding level of electrolyte is higher/lower than at least one predetermined level. Nevertheless, the control means described in claim 1 are more clearly described in the description.

**2. Novelty and inventive step****2.1 Claim 1 :**

Therefore, because of the above-mentioned lack of clarity, the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT. The criteria of Article 33(1) PCT are not met because document D1 discloses (page 1, left-hand column, line 8 to line 12 ; page 1, left-hand column, line 41 to right-hand column, line 57 ; page 1, right-hand column, line 87 to page 2, left-hand column, line 5 ; page 2, left-hand column, line 63 ; page 2, right-hand column, line 76 to line 79 ; claims 1, 2, 4 and 8) a cover for an electric accumulator adapted to be integral with the container of said accumulator characterised in that said cover comprises at least one reservoir adapted to contain a topping up liquid of the electrolyte present in each of said one or more cells of said accumulator, communicating through at least one supply duct of said topping up liquid with said one or more cells ; control means of the level of said electrolyte in each of said one or more cells adapted to prevent / allow the flow of said topping up liquid through said at least one supply duct when the corresponding level of said electrolyte is higher/lower than at least one predetermined level ; one discharge duct of the gases that form inside the cells, the collector duct communicating with at least one of said one or more cells.

The collector duct which communicates with a plurality of accumulation chambers each communicating with one or more cells through at least one corresponding vent channel is

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trivial and well known in the art.

As the subject-matter of claim 1 is not new, it also does not involve an inventive step in the sense of Article 33(3) PCT.

**2.2 Claims 2 to 5, 7, 9 to 14 and 16 to 17 :**

Dependent claims 2 to 5, 7, 9 to 14 and 16 to 17 are dependent on claim 1 and as such also do not meet the requirements of the PCT with respect to novelty and inventive step.

**2.3 Claims 6 and 15 :**

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 6 and 15 do not involve an inventive step in the sense of Article 33(3) PCT.

2.3.1 The document D1 is regarded as being the closest prior art to the subject-matter of claim 6, and discloses (page 1, left-hand column, line 8 to line 12 ; page 1, left-hand column, line 41 to right-hand column, line 57 ; page 1, right-hand column, line 87 to page 2, left-hand column, line 5 ; page 2, left-hand column, line 63 ; page 2, right-hand column, line 76 to line 79 ; claims 1, 2, 4 and 8) a cover for an electric accumulator adapted to be integral with the container of said accumulator characterised in that said cover comprises at least one reservoir adapted to contain a topping up liquid of the electrolyte present in each of said one or more cells of said accumulator, communicating through at least one supply duct of said topping up liquid with said one or more cells ; control means of the level of said electrolyte in each of said one or more cells adapted to prevent / allow the flow of said topping up liquid through said at least one supply duct when the corresponding level of said electrolyte is higher/lower than at least one predetermined level ; one discharge duct of the gases that form inside the cells, the collector duct communicating with at least one of said one or more cells.

The subject-matter of claim 6 therefore differs from this known cover in that: the control means of the level of electrolyte comprise at least one float mechanically connected to a shaft slidably coupled with a guide element.

The problem to be solved by the present invention may therefore be regarded as how to detect and control the level of electrolyte in each cell.

The solution proposed in claim 6 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) because the control mean is described in document D2 (p. 1, right-hand column, l. 98 to l.103) as providing the same advantages as in the present

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application. The skilled person would therefore regard it as a normal /design/ option to include this feature in the accumulator described in document D1 in order to solve the problem posed.

2.3.2 The document D1 is regarded as being the closest prior art to the subject-matter of claim 15, and discloses (page 1, left-hand column, line 8 to line 12 ; page 1, left-hand column, line 41 to right-hand column, line 57 ; page 1, right-hand column, line 87 to page 2, left-hand column, line 5 ; page 2, left-hand column, line 63 ; page 2, right-hand column, line 76 to line 79 ; claims 1, 2, 4 and 8) a cover for an electric accumulator adapted to be integral with the container of said accumulator characterised in that said cover comprises at least one reservoir adapted to contain a topping up liquid of the electrolyte present in each of said one or more cells of said accumulator, communicating through at least one supply duct of said topping up liquid with said one or more cells ; control means of the level of said electrolyte in each of said one or more cells adapted to prevent / allow the flow of said topping up liquid through said at least one supply duct when the corresponding level of said electrolyte is higher/lower than at least one predetermined level ; one discharge duct of the gases that form inside the cells, the collector duct communicating with at least one of said one or more cells.

The subject-matter of claim 15 therefore differs from this known accumulator in that: at least one anti-explosion device is arranged in at least one discharge duct.

The problem to be solved by the present invention may therefore be regarded as how to prevent the explosion of the accumulator due to over pressure.

The solution proposed in claim 15 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) because the control mean is described in document D3 (p. 5, l. 14 to l. 20) as providing the same advantages as in the present application. The skilled person would therefore regard it as a normal /design/ option to include this feature in the accumulator described in document D1 in order to solve the problem posed.

**2.4 Claim 8 :**

The subject matter of claim 8 appears to be new in the sense of Article 32(2) PCT. The combination of the features of claim 8 is neither known from, nor rendered obvious by, the available prior art. No cover with accumulation chambers that have at least one wall provided with tilted planes is described or derivable from D1 which is the closest prior art. Therefore, the subject matter of claim 8 appears to involve an inventive step in the sense of Article 33(3)

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A further purpose is to realise a lead accumulator with free acid that has good cyclability of the positive plate.

Another purpose is to realise a cover for lead accumulators with free acid and a relative accumulator that is not subject to losses of electrolyte for example in the case of temporary turning upside down.

The last but not least purpose is to realise a cover for lead accumulators with free acid and a relative accumulator that is cost-effective and simple to realise.

Said purposes are accomplished by a cover for an electric accumulator adapted to be integral with the container of said accumulator ~~which~~, in accordance with the main claim, ~~is characterised in that it comprises~~

- at least one reservoir, adapted to contain a topping up liquid of the electrolyte present in each of the one or more cells of said accumulator, communicating through at least one supply duct of said topping up liquid with said one or more cells;
- control means of the level of said electrolyte in each of said one or more cells adapted to prevent/allow the flow of said topping up liquid through said at least one supply duct when the corresponding level of said electrolyte is higher/lower than at least one predetermined level.

In the same way, said purposes and advantages are accomplished by an electric accumulator ~~that comprises~~ according to the relative independent claim.

- an open container provided on the inside with one or more cells each adapted to house at least one plate group of said accumulator and to contain the electrolyte;
  - at least one cover adapted to close said container;
- ~~characterised in that said cover is provided with the aforementioned solution.~~

Advantageously, the proposed solution allows the automatic and simultaneous restoring of the level of electrolyte in each cell to be carried out and therefore allows accumulators to be realised that can also operate in high temperature environments.

Again advantageously, the invention foresees that the reservoir be provided with a filling mouth that allows the reserve of topping up liquid to be renewed.

Again advantageously, the proposed cover allows the number of maintenance interventions per unit time of the accumulator to be substantially reduced and in some cases allows accumulators to be realised that do not require interventions for all of their lifetime.

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## NEW CLAIMS

5 1. Cover (1, 101, 102, 103, 104, 105) for an electric accumulator (100) adapted to be integral with the container (2) of said accumulator (100), said cover (1, 101, 102, 103, 104, 105) comprising:

- 10 - at least one reservoir (6), adapted to contain a topping up liquid (R) of the electrolyte (E) present in each of the one or more cells (4) of said accumulator (100), communicating through at least one supply duct (7) of said topping up liquid (R) with said one or more cells (4);
- 15 - control means (9) of the level (L) of said electrolyte (E) in each of said one or more cells (4) adapted to prevent/allow the flow of said topping up liquid (R) through said at least one supply duct (7) when the corresponding level (L) of said electrolyte (E) is higher/lower than at least one predetermined level (S);
- 20 - at least one discharge duct (21) of the gases that form inside each of said one or more cells (4);

25 **characterised in that** said at least one discharge duct (21) comprises at least one collector duct (24) communicating with at least one of said one or more cells (4); **and in that** said at least one collector duct (24) communicates with a plurality of accumulation chambers (25) each communicating with one of said one or more cells (4) through at least one corresponding vent channel (26).

30 2. Cover (1, 101, 102, 103, 104, 105) according to claim 1) **characterised in that** said control means (9) of the level (L) comprise at least one tubular element (10), the duct (11) of which is adapted to hydraulically connect, or not, according to the level (L) of said electrolyte (E), the air chambers (12, 13) that are defined in said at least one reservoir (6) and in each of said one or more cells (4) according to the various levels (L) of electrolyte (E).

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3. Cover (1, 101, 102, 103, 104, 105) according to claim 2) **characterised in that** said air chamber (12) of said at least one reservoir (6) is defined by the surface of the free surface of said topping up liquid (R), by the upper wall (61), and by the portions of side wall (62) of said at least one reservoir (6), emerging from said topping up liquid (R), when the accumulator (100) is in working position.

4. Cover (1, 101, 102, 103, 104, 105) according to claim 2) or 3) **characterised in that** said air chamber (13) of said one or more cells (4) is defined by the surface of the free surface of said electrolyte (E), by the upper wall (41), and by the portions of side wall (42) of said one or more cells (4) emerging from said electrolyte (E) when the accumulator (100) is in working position.

5. Cover (1, 101, 102, 103, 104, 105) according to any one of claims 2) to 4) **characterised in that** said predetermined level (S) of said electrolyte (E) in each of said one or more cells (4) is substantially equal to the height (16) of said cell (4) minus the length (15) of the lower end (10a) of the corresponding one of said at least one tubular element (10) with respect to the upper wall (41) of said cell (4).

6. Cover (101) according to claim 1) **characterised in that** said control means (9) of the level (L) of electrolyte (E) comprise at least one float (18) mechanically connected to a shaft (19) slidably coupled with a guide element.

7. Cover (104, 105) according to any one of the previous claims **characterised in that** said at least one collector duct (24) has at least one wall provided with tilted planes (27, 28).

8. Cover (104, 105) according to any one of the previous claims **characterised in that** each of said accumulation chambers (25) has at least one wall provided with tilted planes (27, 28).

9. Cover (104, 105) according to claim 7) or 8) **characterised in that** said tilted planes (27, 28) define one or more tanks (29, 30) communicating with each

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other.

10. Cover (103, 104, 105) according to any one of claims 1) to 9) **characterised in that** in said at least one discharge duct (21) at least one over-  
5 pressure valve is arranged (28).

11. Cover (103, 104, 105) according to claim 10) **characterised in that** the opening pressure of said at least one over-pressure valve (28) is no less than the pressure exerted by said electrolyte (E) on said at least one over-pressure valve  
10 when said accumulator (100) is turned upside down.

12. Cover (103, 104, 105) according to any one of claims 1) to 11) **characterised in that** said at least one discharge duct (21) has at least one anti-explosion device is arranged.  
15

13. Cover (1, 101, 102, 103, 104, 105) according to any one of the previous claims **characterised in that** said at least one reservoir (6) is provided with at least one filling hole (8) for filling said at least one reservoir (6) that can be closed by at least one corresponding cap (81).  
20

14. Cover (1, 101, 102, 103, 104, 105) according to any one of the previous claims **characterised in that** it comprises a main body (1a) and at least one closing element (1b).

15. Cover 102, 103, 104, 105) according to any one of the previous claims **characterised in that** it is provided with at least one filling, inspection and topping up hole (20) for each of said one or more cells (4), that can be closed through a closing cap (20a).  
25

16. Cover (102, 103, 104, 105) according to claim 15) and any one of claims 2) to 5) **characterised in that** said at least one filling, inspection and topping up hole (20) is realised in correspondence of said at least one tubular element (10), said cap (20a) having at least one opening (20b) adapted to not obstruct said duct (11).  
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17. Electric accumulator (100) comprising:

- a container (2) provided on the inside with one or more cells (4) each adapted to house at least one plate group (5) of said accumulator (100) and to contain the electrolyte (E);
- at least one cover (1, 101, 102, 103, 104, 105) adapted to close said container (2);

10 characterised in that said cover (1, 101, 102, 103, 104, 105) is realised according to any one of claims 1) to 16).

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